Frequently Asked Questions Regarding the Groundwater Situation Surrounding the Coca Cola Site – Paw Paw, Michigan

How Coca Cola North America was identified as having a groundwater problem?

Prior to December 2002, Coca Cola North America (CCNA) was permitted to dispose of their wastewater by spray irrigation onto fields surrounding their Paw Paw facility. The disposal of wastewater in this manner was regulated under Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). Under Part 31, a discharger must obtain a permit from the Department of Environmental Quality (DEQ), Water Bureau (WB) for these discharges. At the time it was believed that such systems were a viable means of wastewater disposal for the food processing industry. However, in the last several years, groundwater monitoring results have shown that these systems may negatively impact groundwater due to the characteristics of the wastewater.

Prior to 2000, permits for food processors generally did not require groundwater monitoring for metals such as iron, manganese and arsenic, because these substances are not typically present in the effluent wastewater. More recently, the DEQ began requesting that food processors monitor groundwater for metals. As new data became available, the DEQ discovered that groundwater hydraulically downgradient of these discharges often contained high levels of iron, manganese and arsenic. Even after identifying the problem in groundwater, it took some time to establish the cause and effect relationship. The problem results from the fact that wastewater from food processing has a very high organic content. The biological activity, also known as Biochemical Oxygen Demand (BOD), associated with disposal of the untreated or minimally treated wastewater with this high organic content creates anaerobic conditions in the soil that releases the naturally occurring iron, manganese and arsenic that had been adsorbed onto soil particles to a form that is soluble in groundwater. The concentrations of iron and manganese leached into groundwater as a result of this process often exceed the aesthetic and health based standards for those parameters established under the state's environmental clean up statute (Part 201, Environmental Remediation, of the NREPA). The recent change in the federal Maximum Contaminant Level (MCL) for arsenic from .050 milligrams per liter (mg/L) to .010 mg/L has caused arsenic to be added to the list of parameters of concern for these discharges. The .010 mg/l MCL for arsenic is also the generic residential clean up criteria under Part 201.

Administrative Consent Order Between DEQ and CCNA (formerly Minute Maid)

An Administrative Consent Order (ACO) is a voluntary agreement worked out between two or more parties involved in a dispute. It has the same effect as a

court order and can be enforced by the court if anyone does not comply with the orders. An ACO was entered between CCNA and DEQ in September of 2000. The purpose of the ACO was to establish a schedule for CCNA to terminate the groundwater discharge and design a treatment system to discharge to surface water under an National Pollutant Discharge Elimination System (NPDES) permit. The construction of the new treatment system was completed in accordance with this consent order. The order also required CCNA to perform response activities under Part 201 including preparation and implementation of a Remedial Investigation/Feasibility Study (RI/FS) and Remedial Action Plan (RAP). Initial RI/FS work was conducted in 2001 and 2002 with limited monitoring the next two to three years. During a sampling event in 2005 elevated metals were detected in monitoring wells downgradient of CCNA's spray fields, initiating a second phase of the investigation. This second phase of investigation was expanded and accelerated by the recent discovery of a link between EDTA and elevated levels of certain metals. In addition, the recent lowering of the arsenic standard from .050 mg/L to .010 mg/L has also expanded and accelerated the RI work.

Ethylenediaminetetraacetic (EDTA) Usage

EDTA is used in the food processing industry, either as a federal Food and Drug Administration (FDA) approved direct additive, such as to preserve color or flavor, or an indirect additive, such as used to clean pipe scale. CCNA has historically used EDTA primarily as a cleaning agent. EDTA was discharged as a component of the wastewater onto the irrigation fields surrounding the CCNA facility.

Does CCNA still discharge wastewater?

A schedule for CCNA to terminate the groundwater discharge and design a treatment system to discharge was agreed upon in the September 2000 ACO. In December 2002 the spray irrigation of wastewater ceased following construction and startup of an onsite wastewater treatment plant. Since this time CCNA has been treating their wastewater and discharging the treated wastewater to surface water.

Drinking Water Concerns

Many residents with impacted water supplies may have questions regarding the health effects from elevated levels of iron, manganese, arsenic, and EDTA. The following is a brief explanation of the occurrence and health effects from these groundwater constituents.

ARSENIC

Earth materials such as bedrock, sand, and gravel may contain arsenic bearing minerals. Arsenic may be dissolved by, and absorbed into, the drinking water we withdraw from the ground. Arsenic has no smell or taste in water so you cannot sense if arsenic is present. The best way to determine if your well water has been impacted is to have it tested for arsenic.

The way arsenic affects our bodies is not fully understood. Studies of exposed populations in the United States have not shown clear proof of health problems caused by drinking contaminated water at levels similar to those found in Michigan well water.

Exposure to levels of arsenic in drinking water above the health standard (MCL is .010 mg/L) over many years could result in health effects such as:

- Thickening and discoloration of the skin. Sometimes these changes can lead to skin cancers. These cancers can be cured if discovered early.
- Stomach pain, nausea, vomiting and diarrhea.
- Numbness in the hands and feet.

IRON

Iron is a necessary nutrient. Although iron occurs naturally in ground water, it is rarely found at concentrations greater that 10 mg/L. Water with high iron levels can form reddish brown particles that settle on the bottom of a glass of water. When iron combines with tea, coffee and other beverages, it can produce an inky, black appearance and a harsh, unacceptable taste. Vegetables cooked in water containing excessive iron turn dark and look unappealing. Concentrations as low as 0.300 mg/L can leave reddish brown stains on plumbing fixtures, tableware and laundry that can be hard to remove. When these deposits break loose from water piping, rusty water will flow through the faucet. Excess iron may cause the growth of iron bacteria. Iron bacteria leave a reddish brown or yellow slime that can clog plumbing and cause an offensive odor.

Symptoms of excessive iron intake are generally seen only in individuals who have a genetic disorder (e.g. hereditary hemochromatosis). Those persons should consult with their physician or other health care provider. Because of aesthetic impacts from iron, the Secondary Maximum Contaminant Level (SMCL) is .300 mg/L. The SMCL is also the generic residential clean up criteria established under Part 201. The health-based Drinking Water Criteria (DWC) is 2.0 mg/L.

MANGANESE

Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy. Manganese is contained in groundwater and soil at low levels. Low to moderate levels of manganese can cause drinking water to exhibit discoloration and an undesirable taste. Exposure to excess levels of manganese may occur from breathing air, particularly where manganese is used in manufacturing, and from drinking water and eating food. At high levels, it can cause damage to the nervous system that results in behavioral changes and other nervous system effects. The aesthetic criterion, or Part 201 generic residential clean up criteria is .050 mg/L and the health based DWC is .860 mg/L.

EDTA

EDTA is a chelator, a Greek term meaning "claw." A chelator can bind strongly to a metal atom. Calcium EDTA and other chelating drugs are used to treat heavy metal poisoning, to remove the metal from the body. Calcium disodium EDTA is approved for use in foods such as canned soft drinks, canned vegetables, various condiments, margarine, and canned cooked shellfish. Similarly, disodium EDTA is approved for use in a variety of foods as well as in aqueous (liquid) multivitamin preparations. Sodium iron EDTA is a component of iron-fortified cereals and other foods (Bothwell and MacPhail 2004, Heimbach et al. 2000, WHO 2003). The FDA estimates that a person's total exposure to EDTA via food sources is 15 milligrams (mg) per day (Whittaker et al. 1993). Neither MDEQ nor the U.S. Environmental Protection Agency (EPA) has regulatory levels for EDTA, the World Health Organization (WHO) drinking-water tolerance dose is 1.9 milligrams EDTA per kilogram body weight (mg/kg) per day. The tolerance dose takes into consideration that EDTA could chelate an essential mineral and remove it from the body, causing a deficiency (WHO 2003). DEQ has evaluated the levels of EDTA in the groundwater at the CCNA site and have determined that EDTA does does not pose a health risk to the community.

Any interested party with additional questions regarding the health effects of these substances may contact Ms. Amy Perbeck, DEQ, WB, Surface Water Assessment Section, Water Toxics Unit at 517-373-1046, or call the Michigan Department of Community Health Hotline at 1-800-MI-TOXICS (1-800-648-6942).

For more information, you can access the following links:

http://www.epa.gov/safewater/arsenic/pdfs/fs_arsenic_justthefactsforconsumers.pdf

http://www.deq.state.mi.us/documents/deq-ead-tas-arsenicbroch.pdf

http://www.atsdr.cdc.gov/tfacts151.pdf

http://www.myfloridaeh.com/programs/chemical_fact_sheets/Iron_FS.pdf

DEQ's short term response to the problem

In response to data collected to date, CCNA has implemented an interim response providing bottled water to several area residences. Of particular concern to the WB are those water supply wells currently identified with levels of arsenic, iron or manganese in excess of the health based criteria. All currently identified residences with levels of these substances above the health based criteria are currently being supplied with bottled water.

DEQ's long term response to the problem

DEQ is requiring that CCNA complete remedial actions in accordance with Part 201 of the NREPA. To date CCNA has installed 50 monitoring wells and vertically sampled the groundwater aquifer at 34 locations. The purpose of this work has been to identify the nature and extent of contamination related to CCNA's former spray fields. On May 1, 2009 CCNA submitted a draft RI report. The RI report contains a comprehensive collection and analysis of all data collected at the site. It includes maps and analysis of geology, groundwater flow, groundwater constituent concentrations, residential wells sampling results, etc. DEQ will review and determine if the RI report complies with the requirements of Part 201. If DEQ determines that the RI complies with Part 201 it will be approved and CCNA will then be required to submit a FS. The FS will identify and recommend a remedial action to address any impacts to human health or the environment. If DEQ determines that the RI does not comply with Part 201 a request will be made for additional work at the site.

Any interested party with questions regarding the on-going response activities at the CCNA site may contact the following DEQ staff:

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